

RESEARCH BRIEF

Diffusing Social Innovations in Philippine Apitourism

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The theory of innovation diffusion (Rogers, 1962) explicated how, why, and at what rate new ideas and technology spread (Rogers, 2003); that is, diffusion is the process by which an innovation is communicated over time among the participants in a social system. Accordingly, Rabadjieva and Butzin (2019) explored this area, specifically the diffusion of social innovations, by posing the fundamental question of how social innovations leave their place of emergence, spread across space, and practiced more broadly. This is hinged on the premise that any social innovations are developed to address social problems within neighborhoods through the inclusion of a large share of voluntary work from engaged citizens accompanied by active support from local authorities and enterprises (Moulaert, 2009). Given local dimension prominence, social innovations are highly situational and context-dependent (Rabadjieva & Butzin, 2019). Most of the literature on social innovation has largely emerged because of the growing dissatisfaction with the technological emphasis in economic innovation literature and innovation policy (Caulier-Grice et al., 2012). Hence, it can be construed that the need to solve social problems and address unmet social needs are the motivating factors of social innovations. When these innovations are adopted and diffused, they can drive societal change and improve societal welfare.

We explore the role of diffusing social innovations in the agricultural sector, particularly in the beekeeping industry. This is of particular relevance for economies that evolved from agricultural to market economy.

According to Gaga and Esaulov (2016), as agriculture is dependent on climate and weather conditions, its output is evaluated not only on the price for the average consumer but also on product quality, production environment, and compliance with national and international standards (i.e., taste and appearance). As such, beekeeping has shaped the activities and competitiveness of the agricultural industry.

In this study, we underscore the Philippines' beekeeping industry. Just like other beekeeping industries across the globe, it is also experiencing challenges associated with a significant reduction in the production of natural bee products (Krivtsov, 2011; Cervanica, 2018). This is because of the fragmented nature of the industry, wherein only individual beekeepers and small enterprises are participating in this venture (Omoyon & Omoyon, personal communication, September 18, 2018). Likewise, despite the Philippines having five of the nine species of honeybees in the world and having the natural environments conducive to beekeeping, bee research and industry is still underdeveloped (Cervancia, 2003). This necessitates the use of innovative technologies in modernizing beekeeping through diffusing research and social innovations.

As such, we pose the research question: how can the diffusion of sustainable apiculture in the Philippines be facilitated? To address this, we set the following research objectives:

1. To conduct an in-depth literature review and interview of key stakeholders of apiculture;

2. To analyze the critical factors driving and inhibiting the diffusion of sustainable apiculture in the Philippines; and
3. To generate recommendations that could help develop sustainable apiculture in other countries and the diffusion of social innovations in general.

Through this study, we shed light on how social entrepreneurs develop and diffuse social innovations in a nascent market—a field of study that is currently undeveloped and needs more research. Relative to innovation studies in business and technology, there has been little systematic analysis of how innovations in the social field are designed, diffused, and supported. For existing studies, most touched on successful and best practices than on explicating patterns and stages of social innovation.

We used a qualitative case study approach to account for contextual conditions, integrate multiple sources of evidence, and explore contributing insights from existing and new concepts that may explain how social entrepreneurship creates and diffuses social innovations (Leedy & Ormrod, 2013; Yin & Chen, 2019). Specifically, we explicate the case of Milea Bath and Body Wellness Essentials (MBBWE) and Milea Bee Farm (MBF), hereinafter referred to as Milea. We contribute to the literature by emphasizing the role of co-competition (Bengtsson & Kock, 2000; Chen et al., 2019) in diffusing social innovations, particularly in apiculture and apitourism. To enhance rigor and reduce bias, we employed key informant interviews (KIIs) and incorporated multiple sources of data, including interviews, observations, videos, and online data (Yin & Chen, 2019), such as Milea’s website and articles (MBBWE, n.d.; MBF, n.d.).

Our findings would allow us to craft policy frameworks for government, private sector, and academe on protecting bees, spreading awareness on beekeeping’s critical importance, and holistically managing the beekeeping industry in the country.

Literature Review

Social Innovation

Social innovations emerged because of the discontent with conventional forms of innovations and the perception that it can deliver equitable and sustainable outcomes (Ziegler, 2017). According

to Caulier-Grace et al. (2012), social innovation is the response to growing social, environmental, and demographic challenges. Nicholls and Murdock (2012) called these challenges as wicked problems—complex, multi-faceted, involve many stakeholders, and seemingly impossible to solve. For Gallouj et al. (2018), social innovation is co-created from the “interaction of competences and preferences of multiple providers, users/citizens, and policymakers” (p. 551). Hence, successful social innovations have durability and broad impact (Westley, 2008). Building on previous studies, we underscore the definition of social innovation as an outcome and as a process. Social innovations through social entrepreneurship are discussed to bridge the link between social innovation and social entrepreneurship and to uncover the process of developing and diffusing social innovations.

Defining Social Innovations

Similar to conventional definitions of innovation, social innovation is also a notoriously vague construct that puts skepticism on whether it can offer effective improvements (Ziegler, 2017). Despite this, social innovations are rapidly spreading, creating impacts on various segments of society. Caulier-Grice et al. (2012) defined social innovations as new solutions that simultaneously meet a social need and lead to new or improved capabilities and better use of resources. Similarly, Neumeier (2012) cited that social innovations are societal achievements that generate improved solutions defined by their absolute novelty more than by their consequences. Social innovations are new solutions that work better than existing practices and result in measurable improvements for society. Thus, it must not just serve to improve an existing idea. It must also effectively promote a social cause improving society and demonstrating potentials to resolve social problems that are not or insufficiently addressed by existing practices. Its strength lies in its ability to be implemented sustainably. That is, by using a collaborative and participative process, it addresses global issues rather than focusing on parts only. Society’s capability to create a steady flow of social innovations and engage vulnerable populations is key to overall social and ecological resilience (Westley, 2008).

As such, because of its capability to create solutions to social needs that are paid little to no attention by institutions, social innovation has

emerged as a potential driver for transformative and disruptive social changes (von Jacobi et al., 2017). Specifically, Domanski et al. (2017) argued that social innovation is a “creative response to immense social problems and societal challenges, such as low quality of health care and education as well as poverty, which affect large parts of the population and have not been successfully addressed by governments” (p. 307).

Social Innovation as a Process

As a process, social innovation is the design and implementation of better ways to harness assets to benefit the people and the planet (Burkett & Hannant, 2019). The Stanford Graduate School of Business (n.d.) defined social innovation as “the process of developing and deploying effective solutions to challenging and often systemic social and environmental issues in support of social progress” (par. 1). Likewise, Westley (2008) underscored that social inclusion, socio-ecological resilience, and social innovation are intimately connected; that is, social innovation is an initiative (e.g., product, process, program) that significantly alters the basic routines, resource, authority flows, or beliefs of a social system. Although it has recognizable stages and phases, achieving durability and scale is a dynamic process that requires both emergence of opportunity and deliberate agency. Thus, it can be a series of actions where every action is performed while keeping in mind society’s needs. It is important for an enterprise to be innovative to maximize outcomes and to constantly create change. Hence, the process of creating social change is innovation, which is met when issues are solved with progress.

Social Innovation as an Outcome

According to Howaldt and Kopp (2012), social innovation as an outcome is “a new combination of social practices in certain areas of action or social contexts prompted by certain actors or constellations of actors in an intentional targeted manner with the goal of better satisfying or answering needs and problems than is possible on the basis of established practices” (p. 47). Hence, social innovations are practices that lead to a better social outcome. It is critical for social innovation to be the final end. Social value is only realized at the outcome and along with the said outcome. It contributes to satisfying needs by using practices that are being employed and practices that seem to be working. Such

practices are then adapted and adjusted to realize much better outcomes. This is supported by Caulier-Grice et al. (2012), wherein “a social innovation should be more effective than existing solutions” (p. 19). It should create a measurable improvement in terms of outcomes (i.e., quality, levels of user satisfaction, rates of adoption, reduction in costs, improved wellbeing, and enhanced social cohesion).

With beekeeping, Cervancia (personal communication, September 10, 2018) and Omoyon and Omoyon (personal communication, September 18, 2018) emphasized the essential role of honeybees in pollinating crops and agricultural output. However, their populations have been declining rapidly, posing problems to the beekeeping industry in a phenomenon known as the Global Honeybee Colony Collapse Disorder (Hitachi, n.d.). Morse and Laigo (1969) enumerated specific factors that prevent the development of beekeeping industry: “(1) predatory birds which consume a large number of honeybees; (2) two species of mite which kill bees in the pupal stage, or so affect development that the bees produced are abnormal; (3) an insufficiency of colonies, as a result of which there are too few drones to mate with virgin queens produced by normal supersedure” (p. 10). Without an innovative solution, a looming food crisis is seen.

Case in point, Hitachi (n.d.) and Australia’s national science agency, Commonwealth Scientific and Industrial Research Organization (CSIRO), developed a technology to help an international group of researchers and farmers collect data on bee behavior. Ultra-tiny radio-frequency identification (RFID) tags are placed on individual bee’s backs to track their movements and understand stress factors and behaviors causing bee deaths. It is an innovation that can address the declining bee population through data-based strategic frameworks.

Social Entrepreneurship and Social Innovation

Social innovation has been coined in various ways (Osburg & Schmidpeter, 2013). On the other hand, social entrepreneurship has manifested swiftly but is slowly gaining theoretical understanding (Arend, 2020). According to Caulier-Grice et al. (2012), the earliest reference to social innovation dates as far as 1960—experimental research within the fields of humanities and social sciences. Since then, it has been used interchangeably with “social enterprise and social

entrepreneurship, technological innovations which yield social benefits, corporate social responsibility and open innovation” (Caulier-Grice et al., 2012, p. 5). Meanwhile, social innovation is used to describe social entrepreneurship, social enterprises, and the work of social entrepreneurs (Dees & Anderson, 2006). For Hoogendoorn et al. (2010), social innovation is within the field of social entrepreneurship.

Defining Social Entrepreneurship

Social entrepreneurship, as a field of study, is still at the developmental stage (Swanson & Zhang, 2010) with a very complex context (de Bruin & Lewis, 2015). According to Swanson and Zhang (2010), social entrepreneurship is positioned with respect on how organizations intend to introduce social change through their business practices. Austin et al. (2012) defined social entrepreneurship as an innovative and social value-creating initiative that can occur within or across non-profit, business, or government sectors. Thus, social entrepreneurs adopt the ideal of value creation and strive to create value almost every step of the way (Habaradas & Aure, 2016). Moreover, according to Peredo and McLean (2006), the continuous engagement of innovation and pursuit of modification of innovations pave opportunities for social entrepreneurship to be a multi-dimensional and resourceful aspect. In other cases, social entrepreneurship transcends the state wherein social ministries have been moving towards a more secular mode of advancing social entrepreneurship (Kelly & Ortega, 2020).

Linkage Between Social Innovation and Social Entrepreneurship

Along the lines of social innovations, Caulier-Grice et al. (2012) defined social entrepreneurship as the set of behaviors and attitudes of individuals involved in creating new social ventures, such as a willingness to take risks and finding creative ways of using under-used assets. Social enterprises are businesses with a social objective of principally reinvesting surpluses for their social purpose (Habaradas & Aure, 2016; Stokes & Wilson, 2006). For Zhang and Swanson (2014), social entrepreneurship is a business philosophy that exceeds efficiency in the triple bottom line (i.e., people, planet, and profit; Elkington, 1997) and gravitates towards effectiveness that fosters business sustainability. To realize this, collaborative

arrangements and partnerships are essential (de Bruin et al., 2017). Moreover, opportunities in social entrepreneurship “are the constructed outcomes of entrepreneurial alertness and motivation, and the organizational, societal, institutional, and market contexts in which the entrepreneur is embedded” (Newth & Woods, 2014, p. 192).

On the other hand, social innovation is broader than social entrepreneurship, given the overlapping concepts (e.g., a social entrepreneur may set up a social enterprise that delivers a socially innovative program). In addition, according to Newth and Woods (2014), “social entrepreneurship emerges from social and historical contexts. These contexts also bring the institutional norms, routines, and conventions that challenge and constrain innovation processes” (p. 192). However, the most important role in social innovations is played by social entrepreneurs. Social entrepreneurs take innovative ideas and employ them in a revenue-making model that benefits society. Innovations that are driven by the needs of the market and aspirations for providing solutions to social issues are the kinds that are used by social entrepreneurs (Mair, 2010). A social entrepreneur identifies a social problem and develops and offers a solution through social innovation and social entrepreneurship. To develop a social enterprise, one must look at triggers that need innovations. By proposing a solution with drive and passion to challenge social issues, a social entrepreneur can link social entrepreneurship and social innovation (Korsgaard, 2011). Hence, social innovation, together with the creation of new social value, are the pillars of social entrepreneurship (Munshi, 2010).

Social Innovation in Apitourism

Other than the social problems mentioned by Domansk et al. (2017) that necessitate social innovations, there have been studies expounding the need to address honeybee decline that threatens agricultural pollination. For instance, Lorenz and Stark (2015) conducted a study in Berlin, Germany inquiring about how beekeeping trends address honeybee decline. By combining methodologies from social science and political ecology, they found that the interplay of actors and procedures feeds the trend—public debates about bees and beekeeping, diversification of beekeeping opportunities, as well as new actors and reasons for beekeeping.

Meanwhile, Puškadija and Kovačić (2016) discussed the Croatian beekeepers' strategy of continuously modernizing their skills. Through the Croatian Beekeeping Alliance comprising 10,000 members managing 350,000 hives, they are able to produce and export bee pollen, royal jelly, and propolis; and facilitate the continued growth of Croatian queen bees. Consequently, among all agricultural producers in Croatia, beekeepers remain the most highly organized and resilient with the challenges of modern beekeeping. Moreover, through interviews with beekeepers and government officials, Franca et al. (2019) identified collaborative opportunities for beekeepers to supply the demand for honey and grow their incomes.

For Fels et al. (2019), because beekeeping also has risk factors (e.g., heavy lifting, high degree of manual materials handling, twisting, and awkward positioning), they emphasized the need to innovate ergonomically. To foster healthy bee activities and enhance output, modernization of agricultural technologies through standard ergonomics interventions (e.g., magnifier inspection, lift assist systems, smokeless method of calming bees) was recommended. Ultimately, in sustaining beekeeping and alleviating poverty, developing economies must aggressively harness its innovation potential hinged on innovation-led and inclusive growth policies, characterized by knowledge creation and absorption efforts essential to society's vulnerable people, to achieve economic and social transformation (Gupta, 2014).

Meanwhile, Go Negosyo (2019) reported that Milea had positioned itself as a social enterprise offering unique experiences to visitors by bringing bees closer to people through a learning experience not only for the visitors but also to farmers who want to learn more about the culture of beekeeping and growing different crops organically. In fact, it has transformed its bee farm into a tourism spot, which embodies the importance of agriculture in (1) making food and other products to sustain and enhance human life; and (2) create a livelihood. Apart from their advocacy to promote sustainable farm practices, they also provide agricultural services (e.g., colony relocation and propagation, rearing honey-producing bees).

Research Gap

An assessment of the impact and diffusion of social innovation in social enterprises requires a thorough analysis of the mechanisms used to spread innovations

and their sustainability potentials. However, there is not much information on the various ways social innovation is diffused, particularly in the context of nascent markets such as the case of beekeeping and apitourism in the Philippines. We fill this gap by uncovering the experience of relevant key players and offers implications for diffusing social innovations.

Methods

Driven by our research objectives, we utilized a case study approach. We deem this appropriate because of the nascent and unique beekeeping situation in our research locale. Also, the absence of quantitative data on beekeeping warrants the need to explicate first the case of beekeeping in the Philippines and how best practices diffuse to other industry stakeholders.

Research Locale: Beekeeping Innovation in the Philippines

The Philippines, being in the tropics, has been deemed as an excellent beekeeping area given its endowment of in good soil, water, and flora necessary and sufficient to position the country as a major honey-producing region (Morse & Laigo, 1969; Cervancia, 2018). Likewise, being home to three native species of honeybees – *Apis florea*, *Apis cerana* (also known as *Apis indica*), and *Apis dorsata* (all of which are found in Palawan and the two latter are found in the other islands) gives the Philippines a significant beekeeping potential (Morse & Laigo, 1969).

Innovation begins with research (Todaro & Smith, 2015). According to Schramm (2013), innovations arise from basic research, applied research, and development engineering conducted by academia and industry. As such, there is a need for Philippine beekeeping to be backed up by research in order to catapult it as a major industry (Cervancia, 2018).

Bee research in the Philippines started in 1968 as a joint project between Dr. Roger Morse of Cornell University and Dr. Francisco Laigo of the University of the Philippines Los Banos (UPLB), who carried out several studies on the behavior and distribution pattern of native bees (Cervancia, 2018). Since then, Dr. Cleofas Cervancia of UPLB, along with other researchers in the country, have advanced pollination studies and continued to advocate for more research on the biology and conservation of native bees.

To develop beekeeping in the Philippines, the Bee Research, Development, and Extension (RDE) agenda for 2012–2016 was crafted through the initiative of the Bureau of Agricultural Research and High-Value Crop Development Program of the Philippine Department of Agriculture (DAR). This involved the participation of beekeepers, academic institutions, government agencies, and private sectors in a series of workshops and consultations. According to Fajardo and Cervancia (2012), it is a roadmap for policymakers and stakeholders that looks into the status of beekeeping, identifies constraints to its growth, formulates strategies to revitalize the industry, and shall be implemented and monitored by the private sector in partnership with the DAR. Together with policy reforms and advocacies, it will be reviewed regularly to monitor changes in the industry.

Fajardo and Cervancia (2012) also highlighted that the Philippine Bee Board (PBB), comprising of elected representatives from the private beekeeping sector, will act as the advisory body to DAR with regards to policies and regulations on bees and related products. A review of existing laws and regulations governing plant and animal health must be done in earnest to avoid overlap in jurisdiction. Strict implementation of biosecurity protocol is imperative to protect and conserve bee genetic resources. Bees and other insects that are potential plant pests should remain under the purview of the Bureau of Plant Industry Quarantine Service (BPIQS).

In recent years, according to Baconawa (2003), honey and other bee products are very expensive in the domestic markets. For instance, honey sells for as much as PHP350.00 (US\$7.00) per kilo; beeswax at PHP500 (US\$10.00); royal jelly at PHP150.00 (US\$3.00) per 10 grams; pollen at PHP2,000.00 (US\$40.00) per kilo; *Apis mellifera* nucleus hive at PHP4,000.00 (US\$80.00); and *Apis cerana* hive fetches at PHP2,500.00 (US\$50.00). Local beekeepers that raise native or imported bees have no problem in marketing their produce. The demand for honey is still very high coming from people in the upper levels of society. The Philippines has been importing more than US\$1 billion worth of honey and bee products since 1989, indicating a huge demand for honeybee products in the domestic market (e.g., health food, base for cough syrups and energy drinks, pollen and royal jelly as components of energy pills and capsules, and beautifying agents).

In the Philippines, varroa mites do not seriously affect *Apis cerana*. Hence, it does not need pest control, which can contaminate bee products. Although, with *Apis mellifera*, acaricides are needed to control mites. Currently, there is no known disease affecting *Apis cerana*. Thus, it does not need antibiotics, miticides, or nematocides. However, rampant deforestation is a threat to honeybees. Likewise, the excessive use of insecticides on farm crops also threatens bees.

To address these threats, the Bureau of Animal Industry (BAI) embarked on a program to promote beekeeping in the 1980s. However, it did not take off because it lacked support from the government in terms of research and development and credit facilities. Hence, the private sector came in. The current beekeeping industry in the country owes its success to the private sector, particularly bee enthusiasts who invested money and effort to carry out their own research and development work.

Key Informant Interview

We employed key informant interviews (KIIs) as our data gathering technique. KIIs are used to collect information from a wide range of stakeholders, including professionals, academe, scholars, industry-practitioners, among others, who have access to first-hand knowledge about an issue (Gutierrez, 2019). KIIs are qualitative in-depth interviews with individuals who are considered knowledgeable on the subject. According to Carroll et al. (2004), key informants are expected to have the expertise and knowledge that may provide insight into the nature of the subject. Conducting KIIs will establish a preliminary framework on how sustainable apiculture diffuses given the experience of our key informants. Such a framework can serve as a baseline for other beekeepers and bee farms to explore, thereby validating our study.

From this process, our data will be validated alongside the existing literature on beekeeping, social innovation, and social entrepreneurship. Findings will lead to the formulation of policy recommendations and frameworks towards the development of the beekeeping industry. Respondents in the KII are identified and selected based on their expertise, experience, and participation in the Philippine beekeeping industry. Their perspectives can enhance the understanding of the overall situation and direction of the beekeeping industry.

Table 1*KII Participants as Data Sources*

Key Informants	Designation and Organizational Affiliation
Dr. Cleofas R. Cervancia	Professor Emeritus and President APIMONDA Regional Commission for Asia, Institute of Biological Sciences, College of Arts and Sciences, University of the Philippines Los Baños
Mr. Rico Pietro Omoyon	Owner, Founder, and Chief Beekeeper, Milea Bee Farm
Ms. Edilee R. Rosales	General Manager, Milea Bee Farm
Mr. Gary Ayuste	Owner, Founder, and Chief Beekeeper, BEEngo Farm,
Mr. Marlon Martinez	Owner, Founder, and Chief Beekeeper, Martinez Bee Farm

Note: See Appendix 1 for the profiles of key informants.

KIIs were conducted with the academia and industry following Rittichainuwat and Chakraborty (2009) and Norrish (2011), wherein interviews were used to gain in-depth insight into a key stakeholder's perceptions, including policymakers, who have been involved in the industry. The participatory approach facilitates the collection of knowledge from stakeholders who have a greater level of knowledge regarding the topic at hand (Gutierrez, 2019; Hedelin, Evers, Alkan-Olsson & Jonsson, 2017). In the KII, we consulted with those in the grassroots on their insights on beekeeping and apitourism in the Philippines, and verify what has been written in the literature. We also solicited their inputs and opinions on possible narratives that can explain results (Mack et al., 2011). We employed semi-structured interviews wherein a specific list of questions was provided to the key informant prior to the conduct of the interview (Longhurst, 2009; Edwards & Holland, 2013). This will also allow us to determine other issues that were not captured in the literature review.

Ethical Consideration

The qualitative data of the KII are transcribed and sent to the research respondents for validation. This ethical practice is done to ensure that the final transcript is free from errors and omissions that may affect the integrity of the analysis (Gutierrez, 2019). Table 1 lists the five key informants we have interviewed. KIIs were conducted from September to October 2018. The first two were selected based on their contribution to beekeeping, and the last two were chosen as samples

of how an established bee farm transfers knowledge to burgeoning beekeepers.

Results

Understanding Milea and its founders

Milea is located in Lipa, Batangas (approximately 93 kilometers south of Manila). Rico Pietro Omoyon (Chief Beekeeper), together with his wife, Edilee Omoyon (General Manager), owns the farm. Rico obtained a Bachelor of Arts from Siliman University, Dumaguete, Philippines. He also completed a beekeeping program from the Harry H. Laidlaw, Jr., Honey Bee Research Facility of the University of California, Davis. Rico conducts seminars and training on apiculture (i.e., *meliponiculture*) and beekeeping for students, practitioners, and farmers all over the country to highlight the importance of bees in the agriculture industry.

Meanwhile, Edilee leads in growing MBBWE, an enterprise that produces and distributes organic bath and body products from the derivatives of beekeeping. She has established relations with small farmers, bee growers, and other manufacturers of natural and organic products to produce world-class skincare products with local ingredients. She is one of the Philippine recipients of the Outstanding ASEAN Women Entrepreneurs Award at the 4th ASEAN Women Entrepreneur Network (AWEN). She holds a degree in Master of Science in Information Technology from De La Salle University, Manila, Philippines.

Milea is a small farm dedicated to the propagation and care of various species of honey-producing bees.

It houses Italian bees, Philippine native honeybees, and different kinds of Philippine native stingless bees. It is situated in a secluded area (five minutes from the main road, Kurba Road) with very few neighbors and without electricity. It started when Rico acquired a colony of bees. During that time, he has no deep expertise in rearing and propagating them, so he decided to attend the Bee Program offered by UPLB's Institute of Biological Sciences. It is a multidisciplinary, integrated, research, and extension program established in 1989 to promote, formalize, and integrate all bee-related research and extension activities of UPLB. They collaborate with beekeepers to get pollen samples, conduct research to provide technical services to all sectors, promote standardization of bee products, continue developing appropriate apicultural technologies for farmers, women, and entrepreneurs, and enhance biodiversity through conservation and management of indigenous bee species. Rico applied what he learned in the then-nascent Milea. Eventually, UPLB made Milea one of their sites for exposure trips.

There came the point when there was a high demand for honey. However, Milea cannot supply it. Edilee also needed honey and *propolis* for MBBWE, but there is inadequate supply. The problem is worsened by the propagation of fake or adulterated honey. Rico and Edilee sought other beekeepers' help, but no one was willing to teach their practices. Edilee then found the bee program of Harry H. Laidlaw, Jr., Honey Bee Research Facility of the University of California, Davis. Rico applied and got admitted into the program. His experience made him realize that there are more than 25,000 species of bees, but only seven species manufacture honey. In the United States of America, one out of the seven species is available, whereas in the Philippines, all seven are present. An opportunity became apparent. For instance, in California, they earn US\$3 billion per year from the honey production of just one bee specie. It is an area of opportunity for Filipino beekeepers to take advantage of the presence of all seven species of bees capable of making honey. This motivated Rico to return to the Philippines and apply what he learned. He translated his skills in managing European and Italian honeybees to managing native stingless bees. When he returned, he developed Milea to become a site where potential beekeepers can learn about apiculture, specifically meliponiculture. Rico's

first learners were indigenous people and small-scale farmers.

Non-government organizations (NGOs) also sought Milea's help in teaching apiculture to other indigenous groups. Milea then became a member of Spread Organic Agriculture in the Philippines (SOAP) that gives monthly free talks on different topics. Milea serves as one of the speakers for free. Consequently, more people became interested in beekeeping and asked Rico if he can teach beekeeping, in which Rico agreed. Rico's learners also became interested in visiting Milea. It was a combination of concepts and practices that they liked the visit, which spread through word-of-mouth and online presence (i.e., social media). Initially, there were no entrance fees, but the size of visitors increased. Hence, Rico and Edilee decided to charge a minimal entrance fee of PHP100.00 (US\$2.00), and then slowly increased to PHP150.00 (US\$3.00) to PHP200.00 (US\$4.00). From just visits, they now teach the methods they employ in apiculture.

Students, tourists, and potential beekeepers and farmers who are interested in apiculture visit the farm. They are given a guided tour to see the bees in their habitat. Visitors are given a chance to taste honey, fresh from the hive; get to know and see the different honey-producing bee species; know the sources of nectar and pollen as well as edible flowers; discover the relationship between bees and flowers; and understand the role of bees in the food chain.

Milea practices apiculture (i.e., propagation of *Apis* bees) and meliponiculture (i.e., propagation of stingless bees). Rico gives beekeeping talks, seminars, and workshops that provide an avenue for learning about pollinators, honey-producing bees, and valuable information about the bees' impact on the food chain. Of equal importance, it also provides awareness on how to attract and protect bees so they can be utilized for sustainable agriculture. When people realize the relevance of bees in ecology, they will create an impression that they have to protect bees and know how to react when bees are around. Such is also important for local government units (LGU) through the Municipal Agricultural Office (MAO) so that such activity can be participated by farmer groups/federation to maximize information dissemination.

Through the MBBWE, Milea also ventured into producing cosmetic products for over seven years now and have been using natural beeswax as a major ingredient in various natural and organic

products. MBBWE began when Rico and Edilee’s son contacted skin asthma. After various and costly visits to dermatologists, they decided to try natural products. They initially searched for local and imported brands but did not find anything helpful. Hence, they decided to create soaps and natural moisturizers for their son. Later, Edilee took formal studies from local and foreign experts in the field. Now, they are producing products requested by family, friends, and customers. They source beeswax requirements around the country. To avoid acquiring raw materials that are of questionable reliability and credibility, they acquire it from the beekeepers they have trained before, who eventually became their suppliers—a value chain approach (Rivera & Gutierrez, 2019).

Part of Milea’s core value is searching for valuable beekeeping practices that can be shared with the local honey hunters. They did various research and attended proper training to innovate beekeeping technologies and honey harvesting practices that would promote sustainability of the local honey bee species, increase crop production, and develop an alternative livelihood for the farmers. They emphasize that pollination is the primary

purpose of beekeeping and that honey harvest is the reward. They educate both farmers and the public on sustainable beekeeping practices—from hunting, management, hygienic harvesting, and post-harvest. Figure 1 illustrates the chronology of Milea.

People are made to understand the importance of honeybees, its role in ecology to help in pollinating plants, and the health benefits that honey and other hive products provide. Interested parties are given basic bee biology lectures, and methods of attracting honeybees to their desired location using queen cages, swarm traps, and other pertinent beekeeping methods where farmers need not spend so much to have their own pollinators. Everything in their program is designed simply so it can be replicated in other areas, mainly to update traditional honey hunters/beekeepers/farmers on the proper beekeeping practice and to increase crop production. Milea maintains a biodiversity-friendly environment for their practice of apiculture and meliponiculture. It is their goal to continually cultivate the enthusiasm of local farmers to nurture their own bee colonies that may pave the way towards sustainable agriculture and motivate people to work with nature.

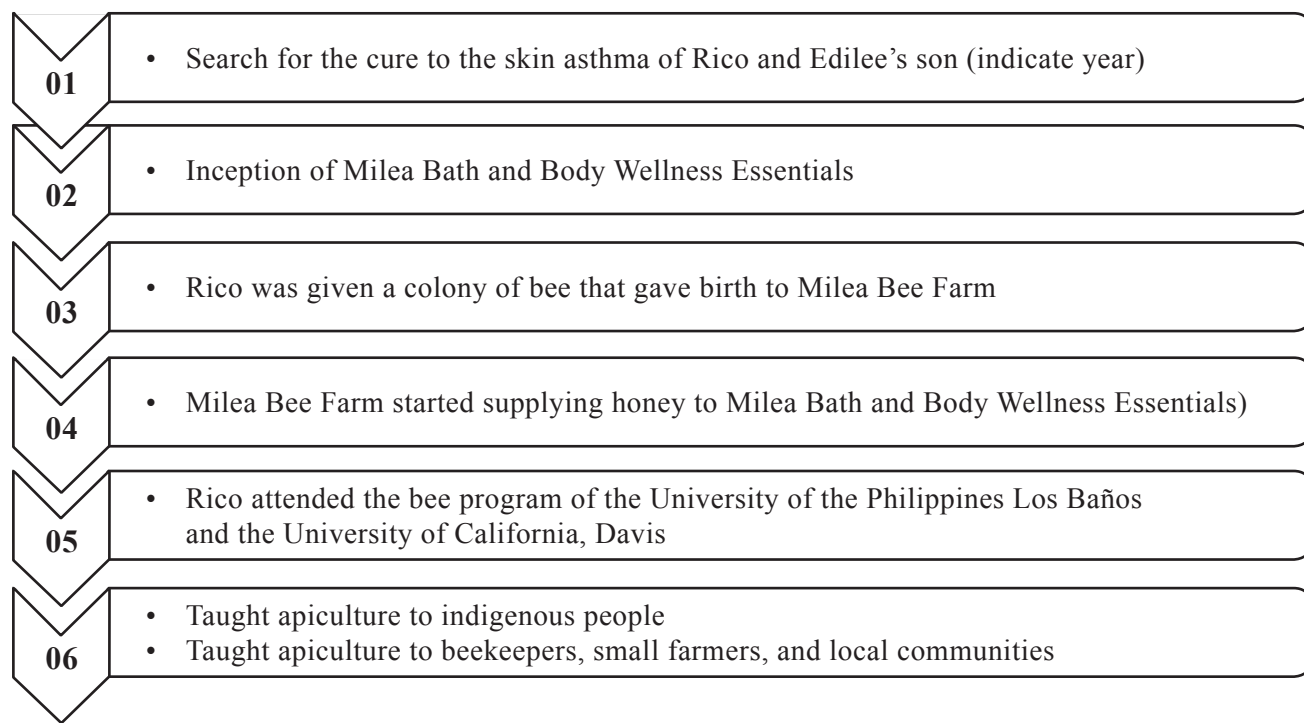


Figure 1. Chronology of Milea

Findings from KII

Results of the KII implied that the diffusion of social innovations begins with beekeeping research as what Cervancia (personal communication, September 10, 2018) said, and access to beekeeping practices as what Omoyon and Omoyon (personal communication, September 18, 2018) have emphasized. According to Cervancia (personal communication, September 10, 2018), for the academia to reach out to more beneficiaries and more localities, technology needs to be developed first. It is necessary because if there is no local data, it is challenging to know what appropriate beekeeping technique must be developed. That is, European, American, and Asian beekeeping is entirely different from the Philippine beekeeping because of the differences in climate and plant resources. It is not enough to determine the appropriate beekeeping technique; the role of research and development is also critical—technologies and techniques taught must be based on intensive research. According to Cervancia (personal communication, September 10 2018):

For example, we promoted bees as pollinators. So we have developed the technology. We tested it first (i.e., how did we know that stingless bees are good pollinators of mangoes). Thus, intensive research is done (i.e., what other plants are pollinated by stingless bees). It is therefore backed up by empirical data. And also, the technology like propagation, there are different aspects that require understanding (i.e., what kind of hive should be used, what kind of food, what kind of management). If we bring it to communities, it is already tested and validated.

However, this is easier said than done. One of the setbacks is the lack of technical capabilities by those organizations conducting trainings. Cervancia (personal communication, September 10, 2018) argued that they might have the knowledge or basic information and skillsets, but most of those providing trainings are sharing information that is not research-based. Beneficiaries of beekeeping training should know why certain things are being done and the reasons behind such (i.e., what kind of box, management, etc.).

With the rising demand for beekeeping training and the proliferation of unofficial beekeeping training, Omoyon and Omoyon (personal communication, September 18, 2018), who established Milea,

endeavored to change this landscape. As discussed earlier, a colony of bee given to the Omoyons started Milea. Just like any other potential beekeeper, they do not have technical expertise in beekeeping, so Rico decided to take training programs at the UPLB. As demand continues to rise, the unwillingness of other beekeepers to share techniques due to fear of competition encouraged Rico to take advanced courses in the U.S.A., where he saw the lucrative opportunity of cultivating bees, particularly stingless bees and providing the training to other small beekeepers and bee farms. He established his supply chain through the beekeepers he trained, which then established their own bee farms. Hence, Omoyon and Omoyon (personal communication, September 18, 2018) emphasized that the **lack of a collaborative environment** for beekeepers in harnessing stingless bees is the major concern that has to be addressed to stimulate growth in this nascent market. This constraint is also exacerbated by the lack of willingness of various beekeepers to share techniques and best practices.

Alongside these constraints, Omoyon and Omoyon (personal communication, September 18, 2018) also underscored the problem of the “spread of fake honey” (adulterated honey) and the need to inform consumers on how to spot them. This leads to the bigger problem of independent, self-determining, and competitive beekeepers (i.e., beekeepers who leave the supply chain after they learn the basic skills and techniques). Rather than being collaborative, they become competitive.

To address these pronged problems, Omoyon and Omoyon (personal communication, September 18, 2018) opened Milea for partnership by training indigenous people and small-scale farmers (Ayuste, personal communication, October 20, 2018; Martinez, personal communication, October 29, 2018), for free, on the tools and techniques of meliponiculture. Eventually, they are able to produce quality products, enabling them to participate in the supply chain. As what Omoyon and Omoyon (personal communication, September 18, 2018) emphasized:

Now that a lot of people know about Milea, they go to us for partnership. But my focus is really on the indigenous people; when they harvest, they do not have linkages to the market, no social media whatsoever. They need to dispose it. We do have a buy-back guarantee that we bring. It might be possible that others may learn

about our source too since we disclose them. It already happened. They ask how much we buy it, and then they try to buy it from the indigenous people at a quite higher price. The good thing is, these people whom we have trained have loyalty. They are the ones telling us that an individual goes to them asking if could sell.

Despite threats of competition, Omoyon and Omoyon (personal communication, September 18, 2018) welcomed it. Rico continuously shares his best practices because “when you have partners sharing the same practice and vision, you will be able to establish the market, not individually but with them.” They believe that meliponiculture is not for everyone. The work is not easy, and it is only those who are determined who will stay and keep going with the practices.

Omoyon and Omoyon (personal communication, September 18, 2018) emphasized that they will not have a market if they are the only ones who know and understand the nature of bees and beekeeping. Hence, they welcome visitors (i.e., farmers, beekeepers, researchers, students, kids, among others) to see how things are done in Milea. Through farm visits, they are able to promote a different mindset. For example, Omoyon and Omoyon (personal communication, September 18, 2018) highlighted that “bees are not for honey, they are for pollination.” It can be construed that part of the solution is awareness.

What we really aim for is to protect the bees so they can populate, and to spread awareness about taking care of the bees. Sometimes, when you don't culture them, they become less productive. Hence, they have to be managed properly. The concept of beekeeping thus changed from being focused in harvesting honey to holistically managing it. (Omoyon & Omoyon, personal communication, September 18, 2018)

Sharing best beekeeping practices serves various purposes—they are able to secure their supply of honey and provide markets for the produce of small scale farmers while being assured of the quality because the same technique has been applied. Hence, diffusion does not stop with training. It is accompanied by monitoring to ensure that the practice is being executed accurately. Case in point: the BEEngo

Farm (Ayuste, personal communication, October 20, 2018) and Martinez Bee Farm (Martinez, personal communication, October 29, 2018) benefitted from the diffusion of innovation from Milea. Both also subscribe to meliponiculture like Omoyon and Omoyon (personal communication, September 18, 2018). Ayuste (personal communication, October 20, 2018) and Martinez (personal communication, October 29, 2018) attested that the model of Omoyon and Omoyon works. This study evaluates the model, based on their testimonies, on the following aspects: (1) availed meliponiculture training from Omoyon and Omoyon (personal communication, September 18, 2018); (2) practical lessons learned; (3) experienced business growth; and (4) further diffusion of knowledge. Testimonials are found in Table 2.

It can be seen that diffusion of knowledge, practices, and innovation created ripples in the form of business venture growth for BEEngo Farm and Martinez Bee Farm. To sustain diffusion, recipients of training by Omoyon and Omoyon (personal communication, September 18, 2018) also conducts training for other beekeepers, small scale farmers, and indigenous people not only in nearby places but also in far-flung provinces. Moreover, it is also evident that the professional relationship between Omoyon and Omoyon, and Ayuste and Martinez did not stop after training. It has persisted and has evolved into a collaborative ecosystem for the trainer and the then trainee. Figure 2 illustrates the process by which diffusion started with Omoyon and Omoyon.

When asked about the future of Milea and meliponiculture, Omoyon and Omoyon (personal communication, September 18, 2018) see themselves evolving towards a center for excellence for beekeeping and processing. To be able to do this, they aim to strengthen partnerships with higher educational institutions to do more research on Philippine honey and make these available to everyone, particularly beekeepers. They also aim to forge more collaborations with other bee farms so that everyone can benefit. This is consistent with Cervancia (2018) wherein technologies must reach out to the greater community, to poor farmers, and any sectors such as entrepreneurs and indigenous people. As Cervancia (personal communication, September 10, 2018) emphasized, “technology is very important because if they know the know-hows, the rate of success is higher.” That is, if it

Table 2*Testimonials on the Diffusion of Knowledge from Milea*

Aspects	BEEngo Farm (Ayuste, personal communication, October 20, 2018)	Martinez Bee Farm (Martinez, personal communication, October 29, 2018)
Availed meliponiculture training from Omoyon and Omoyon	“Mr. Omoyon shared everything that has to be learned by a beekeeper, most especially keeping stingless bees. He taught me how to properly rear and populate stingless bees, what plants are most appropriate for stingless bees, and how to protect the stingless bees from pests. To further expand my technical skills, I also underwent training at the UPLB. However, I can say that I learned much more from Mr. Omoyon because he monitors my progress even after my training with him.”	“We were not interested in rearing <i>kiwot</i> before. We just get rid of their hives. Now, we take care of stingless bees in our farm. I learned the practice of meliponiculture from Milea, where I served as a beekeeper. In this way, my wife and I can be together.”
Practical lessons learned	“The practical lessons I learned from Mr. Omoyon have huge effects on the rapid growth of my small farm. I only had a mango farm before, but when I populated it with stingless bees, it became what is now BEEngo Farm, from the conjunction of bees and mango. I was an Overseas Filipino Worker (OFW) before. When I returned for good in the Philippines, I have no job or livelihood. That’s why it was a blessing that I got to know Mr. Omoyon, and learn from him the tools of the trade in beekeeping, specifically meliponiculture. It was very timely since many tourists, including students who also want to learn how to take care of stingless bees for better pollination, are now visiting our province.”	“Today, many in Bicol are already taking care of stingless bees. Most of them learned beekeeping from Mr. Omoyon when he visited the Bicol region as a trainer of the Department of Agriculture. From my experience, his technique of teaching is very detailed. We are assured that what we are learning is also being practiced in Milea. Unlike other trainers who just teach how to reproduce the stingless bees but eventually, they die. When Mr. Omoyon trains, he does not withhold information. He teaches everything to us and answers all our questions.”
Experienced business growth	“Our small <i>barangay</i> of San Vicente in the town of Tunga, Province of Leyte, is now an example of a sustainable community. Most, if not all, of our local community members are aware of the importance of bees in the environment. Tourists who visit our place are given a short talk on understanding the importance of beekeeping. In fact, we transformed a school here into a “bee-friendly school” wherein students and their parents were taught the proper way of harvesting honey. Also, we planted various plants around the school that are suitable for bees.”	“We will not have our own bee farm if not for the financial assistance from the Omoyons, and the beekeeping lessons they provided us since we started and went independent. Today, we have grown a lot of stingless bees, and beekeeping has spread in other towns/ <i>barangays</i> .”
Further diffusion of knowledge	“Our small <i>barangay</i> of San Vicente in the town of Tunga, Province of Leyte, is now an example of a sustainable community. Most, if not all, of our local community members are aware of the importance of bees in the environment. Tourists who visit our place are given a short talk on understanding the importance of beekeeping. In fact, we transformed a school here into a “bee-friendly school” wherein students and their parents were taught the proper way of harvesting honey. Also, we planted various plants around the school that are suitable for bees.”	“Because of what I learned in Milea, I am able to share the beekeeping techniques to my relatives, neighbors, and community members. This is to be able to increase the harvest that we can contribute to Milea. We now have the same system with Milea. During difficult times, we always seek the help of Milea. I can say that we have already come so far since they helped us. There are now many of us taking care of bees and of the mountains of Sorsogon.”

Note: BEEngo Farm (Leyte) and Martinez Bee Farm (Sorsogon) have become partners of Milea and members of its supply chain. They follow the same setup and practices with that of Milea.

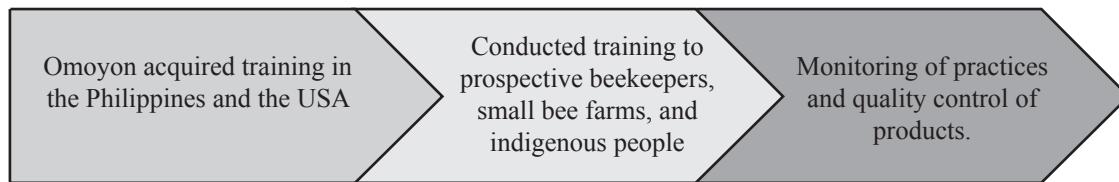


Figure 2. Diffusion of Skills, Techniques, and Best Practices

is supported by science, beekeeping can be done right, and this will yield success to those who will venture into meliponiculture.

Discussion

From the history of Milea and key findings from the KII, Milea defined social innovation as dynamic and iterative. Social and environmental problems are identified and transformed into business solutions. Milea voluntarily shares its technology to stakeholders, including competitors who become members of their value chain. As they operate in a nascent market, where problems are mostly related to poor linkages in the supply chain, training their prospective suppliers is optimal. As they propagate their beekeeping practices, their standards are being monitored and maintained, allowing them to secure high-quality bee products.

Milea resonates closely with the hybrid nature of social enterprises (Mongelli et al., 2019). The joint pursuit of business and social impacts is at the core of who social enterprises are and what they do. Although such hybrid nature of social enterprises makes them different from other organizations, it also makes them susceptible to social-business tension arising from the competing demands of business and social goals, which is often cited as a cause of failure for social enterprises (Wry & York, 2017). For Milea, the joint pursuit of social and business impacts has led to the dynamic creation of social innovation (i.e., a hybrid model of sustainable beekeeping). Milea's founders have turned the problems in their value chain into opportunities to create both business and social impacts. For example, after MBBWE faced the problem of insufficient supply of locally-produced honey coupled with the finding of destructive practices of local bee hunters, Milea started to train indigenous people sustainable beekeeping practices voluntarily. This has helped Milea expand its supply for manufacturing MBBWE products and its social impact by protecting the livelihood of

indigenous people and the conservation of native bees. Furthermore, by creating public awareness about the importance of bees and sustainable beekeeping, Milea builds the market for native honeybee products.

Milea showed that social innovations in a nascent market context could be diffused through cooperation, where competitors both compete and cooperate with each other (Bengtsson & Kock, 2000; Chen et al., 2019). Nascent markets are characterized by unclear and unstable market demands and supply chains (Gligor, 2013), which was evident in Milea's case. Cooperation has been considered as a strategic option in several global industries, such as automobile and electronic industries (Chen et al., 2019). Although cooperation increases firms' innovation, efficiency, and competitive advantage, it is difficult to manage as simultaneous collaboration and competition between firms often create tensions that could lead to a destructive rivalry between firms (Gnyawali & Park, 2011; Pellegrin-Boucher, Le Roy & Gurau, 2017). In light of this issue, scholars have examined cooperation and suggested that firms can manage their benefits and risks through partner selection, equity joint venture structures, and contracts. Such market mechanisms are adopted and examined in the context of established commercial firms and global industries. Hence, how social enterprises, such as Milea, manage cooperation can diffuse social innovations and foster social entrepreneurship needs further investigation.

Conclusion

Based on an in-depth literature review and key informant interviews (objective 1), our analysis suggests that in a nascent market context, social entrepreneurs can continuously innovate and refine their social impact by simultaneously building supply chain capabilities, creating consumer awareness, and embedding social value in their market solutions. It is the joint pursuit of business and social impacts

pursued through an emergent approach to innovation and supply and value chain formation, which could distinguish social enterprises in a nascent market context from other types of enterprises. Further, observations suggest that social enterprises could remain economically viable and socially impactful by building interdependence between social and business objectives. This study suggests striking a balance between society and business. Specifically, the founders created two different yet complementing organizations—the bee farm itself and the MBBWE. The founders were able to create a hybrid business model that embedded social value in their value chain.

In the case of Milea, we found that technology-sharing (see Puškadija & Kovačić, 2016; Gnyawali & Park, 2011; Munshi, 2010), and collaborative advantage (see Franca et al., 2019; de Bruin et al., 2017; Ziegler, 2017) are the critical factors driving the diffusion of social innovations in apiculture and the lack of thereof are those that inhibit it (objective 2). Specifically, Milea shares its technology to small and non-commercial beekeepers that are interested in establishing their own bee farms. It prefers beekeepers that have limited access to training. The founder is aware that those they train will be Milea's competitors someday, but he sees this not as a direct competition but as a collaborative advantage to secure Milea's supply chain. He admits that Milea's capacity is not enough because their land area is small. To address capacity constraints, he willingly trains small farmers who will then become Milea's supplier and remain committed to sustainable practices of producing high-quality bee products. Until now, there is still a strong linkage between Milea and other bee farms, particularly BEENgo Farm.

Milea harnesses its collaborative advantage in guaranteeing the supply and securing markets that are still at the nascent stage. Due to the lack of economies of scale and scope, beekeeping is still not considered as an industry in the Philippines despite the availability of natural resources conducive to beekeeping and efforts of the government to promote beekeeping.

Finally, for beekeeping to become a truly significant industry, we recommend the diffusion of Milea's social innovations through (objective 3): (1) accessibility of soft and hard technical expertise, (2) replicability of best practices, (3) transferability of existing technology to other beekeepers, and (4) authenticity of purpose. Therefore, it can be construed that embedding social

value in the supply chain would allow stakeholders to better manage the social-business tension in social enterprises. Likewise, in nascent markets, social entrepreneurs can scale their impact by creating both the supply and demand side of the markets.

For further research, there is a need to document more cases on successful and non-successful innovative beekeeping practices for both developed and developing economies. This will improve the vague construct of social innovation, as argued by Ziegler (2017), thereby creating effective improvements in apitourism.

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Declaration of Ownership

This report is our original work.

Conflict of Interest

None.

Ethical Clearance

This study was approved by the institution.

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Appendix 1

Profiles of Key Informants

The University of the Philippines (UP) Board of Regents conferred **Dr. Cleofas R. Cervancia** as Professor Emeritus in June 2013. She completed her Ph.D. degree in Entomology at the University of the Philippines Los Baños (UPLB) and a post-doctoral at the University of Wales, United Kingdom, and has been a pro-active faculty of the Environmental Biology Division of the Institute of Biological Sciences (IBS), helping develop many key courses. Prior to retirement, she taught courses in biology and environmental biology, such as Ecology and Pollination Biology. She has been an astute Deputy Director and Director of IBS for several years, and has been pivotal in the development of multi-disciplinary Bee Research and Extension, and maintain academic standards within the Biological Sciences. Dr. Cervancia is recognized for her exceptional contribution to the University in promoting sustainable Apiculture, and the advancement of research and conservation on Philippine bees. She has been extensively involved with the multi-awarded UPLB Bee Program (UPLBBP), which has an important role in the advancement of the beekeeping industry in the Philippines. It endeavors to modernize beekeeping practices to match international standards; and to assist technical services in terms of bee pest and diseases diagnosis, bee product analysis, and pollination advisory. Most important accomplishment of program was the integration of stingless bees in Philippine farming systems. UPLBBP developed sustainable strategies by exploring the potentials of local species of *Apis* and *Tetragonula* bees. Proofs of the consistency of performance of Dr. Cervancia are the numerous awards she garnered. She received the UP Scientist Award in 2012 for her scientific productivity, Civil Service Commission Presidential Lingkod Bayan Award, and UP Alumni Association Outstanding Alumni for community services through promotion of beekeeping nationwide. The UPLB

Bee Program, which she used to coordinate, was awarded the Civil Service Commission PAG-ASA award, CHED Outstanding Extension Award (National Winner), CHED Outstanding Research Program (Regional Winner) and UPLB Outstanding Extension and Research Program.

Mr. Rico Pietro Omoyon is the Owner and Chief Beekeeper of Milea Bee Farm. Apart from skills training on apiculture he has attended in the Philippine and abroad, he obtained a Bachelor of Arts from the Siliman University, Dumaguete, Negros Oriental, Philippines. Currently, he conducts seminars and trainings on apiculture and beekeeping for students, practitioners, and farmers all over the country to highlight the importance of bees in our agriculture industry. His expertise is on apiculture, apitourism, and beekeeping.

Ms. Edilee R. Omoyon is the Owner and General Manager of Milea Bee Farm. She is also taking the lead in growing Milea Bath and Body Wellness Essentials, an enterprise that produces and distributes organic bath and body products from the derivatives of beekeeping. She has established relations with small farmers, bee growers, and other manufacturers of natural and organic products in order to produce world-class skin care products with local ingredients. She is a one of the Philippine Recipients of the Outstanding ASEAN Women Entrepreneurs Award at the 4th Association of Southeast Asian Nations (ASEAN) Women Entrepreneur Network (AWEN). She holds a degree in Master of Science in Information Technology from De La Salle University, Manila, Philippines. Her expertise is in entrepreneurship.

Mr. Gary Ayuste is the Owner and Chief Beekeeper of BEEngo Farm located in Tunga, Leyte. Mr. Ayuste previously visited Milea Bee Farm, where he attended a workshop on sustainable beekeeping from Mr. Rico Omoyon. Afterwards, he established his own bee farm

that also provides beekeeping workshops to aspiring beekeepers. The farm also serves organically prepared meals to visitors and tourists, whose ingredients were freshly picked from the farm.

Mr. Marlon Martinez is the Owner and Chief Beekeeper of Martinez Bee Farm. He previously worked for a decade with Mr. Rico Pietro M. Omoyon, Owner and Chief Beekeeper of Milea Bee Farm. Mr.

Martinez' wife, Ms. Yolanda Olivo is co-managing the bee farm with him. His wife was formerly a Sales Representative of Milea Bath and Body Wellness Essentials. During his stint at Milea Bee Farm, he learned the tools and techniques of meliponiculture from Mr. Omoyon. Afterwards, he established his own bee farm that also provides beekeeping workshops to aspiring beekeepers.